

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 October 2004 (21.10.2004)

PCT

(10) International Publication Number
WO 2004/090140 A3

(51) International Patent Classification⁷: C12N 15/82,
15/11, A01H 5/00

(21) International Application Number:
PCT/EP2004/003995

(22) International Filing Date: 9 April 2004 (09.04.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03076044.1 9 April 2003 (09.04.2003) EP
60/496,688 21 August 2003 (21.08.2003) US

(71) Applicant (for all designated States except US): BAYER
BIOSCIENCE N.V. [BE/BE]; Technologiepark 38,
B-9052 Gent (BE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): DE BLOCK, Marc
[BE/BE]; Abrikozenstraat 26, B-9820 Merelbeke (BE).

(74) Common Representative: BAYER BIOSCIENCE N.V.;
Technologiepark 38, B-9052 Gent (BE).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

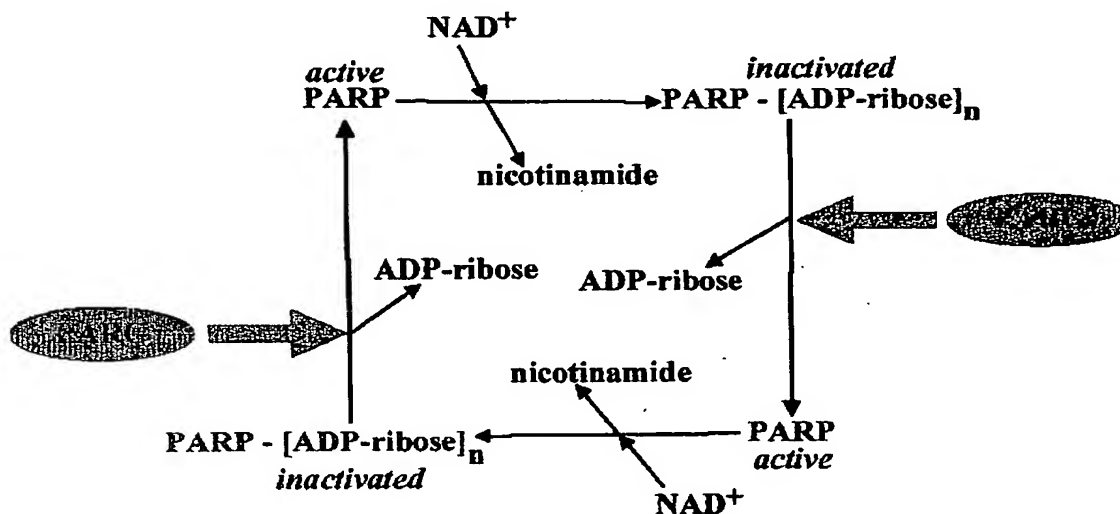
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,
GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— as to the identity of the inventor (Rule 4.17(i)) for the fol-
lowing designations AE, AG, AL, AM, AT, AU, AZ, BA, BB,
BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE,
DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM,
HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,
LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD,
SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ,
VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European

[Continued on next page]

(54) Title: METHODS AND MEANS FOR INCREASING THE TOLERANCE OF PLANTS TO STRESS CONDITIONS



(57) Abstract: Methods and means are provided to increase the tolerance of plants to abiotic stress or adverse growing conditions, including drought, high light intensities, high temperatures, nutrient limitations and the like by reducing the activity of endogenous PARP proteins in plants.



patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT,

LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report

(88) Date of publication of the international search report:
23 December 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/003995

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/82 C12N15/11 A01H5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N A01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, EMBL, MEDLINE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PANDA SATCHIDANANDA ET AL: "tej defines a role for poly(ADP-ribosyl)ation in establishing period length of the Arabidopsis circadian oscillator" DEVELOPMENTAL CELL, vol. 3, no. 1, July 2002 (2002-07), pages 51-61, XP009035930 ISSN: 1534-5807	1-19
Y	page 52, left-hand column, paragraphs 2,3 page 58, left-hand column, paragraph 3	1-16
X	US 2002/040490 A1 (ALLEN KEITH ET AL) 4 April 2002 (2002-04-04) SEQ ID No.: 424 page 1, right-hand column, paragraph 10 ----- -/-	1-16

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

10 September 2004

Date of mailing of the international search report

28/09/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Zellner, E

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/003995

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/000898 A (SYNGENTA PARTICIPATIONS AG ; GOFF STEPHEN ARTHUR (US); CHEN WENQIONG () 3 January 2003 (2003-01-03) SEQ ID No.: 550 page 34, lines 23-29 -----	1-16
Y	WO 03/008540 A (SYNGENTA PARTICIPATIONS AG ; KATAGIRI FUMIYAKI (US); COOPER BRET (US);) 30 January 2003 (2003-01-30) page 95, lines 13-32 -----	1-16
A	WO 99/53050 A (WANG MING BO ; COMMW SCIENT IND. RES ORG (AU); GRAHAM MICHAEL WAYNE (AU) 21 October 1999 (1999-10-21) abstract -----	1-16

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/EP2004/003995

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2002040490	A1	04-04-2002	NONE		
WO 03000898	A	03-01-2003	WO EP	03000898 A1 1402037 A1	03-01-2003 31-03-2004
WO 03008540	A	30-01-2003	WO	03000897 A2	03-01-2003
			WO	03000904 A2	03-01-2003
			EP	1402038 A2	31-03-2004
			EP	1399561 A2	24-03-2004
			EP	1409696 A2	21-04-2004
			EP	1402042 A2	31-03-2004
			WO	03000905 A2	03-01-2003
			WO	03000906 A2	03-01-2003
			WO	03008540 A2	30-01-2003
			WO	03007699 A2	30-01-2003
			WO	03027249 A2	03-04-2003
			US	2003135888 A1	17-07-2003
			US	2004010815 A1	15-01-2004
			US	2004016025 A1	22-01-2004
WO 9953050	A	21-10-1999	AU	760041 B2	08-05-2003
			AU	2951499 A	01-11-1999
			CA	2325344 A1	21-10-1999
			CN	1306571 T	01-08-2001
			EP	1068311 A1	17-01-2001
			WO	9953050 A1	21-10-1999
			JP	2002511258 T	16-04-2002
			NZ	507093 A	29-08-2003